



**Johnson Space Center  
Center Operations Directorate  
Facilities Management & Operations Division (FMOD)**



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# **PROJECT MANAGEMENT: WHO IS DOING IT RIGHT AND WHAT ARE THE KEY PRACTICES?**

## **CONSORTIUM BENCHMARKING STUDY AMERICAN PRODUCTIVITY QUALITY CENTER**



**PRESENTER: JAY C. HOOVER  
SENIOR PROJECT MANAGER**



# STUDY GOAL AND SCOPE

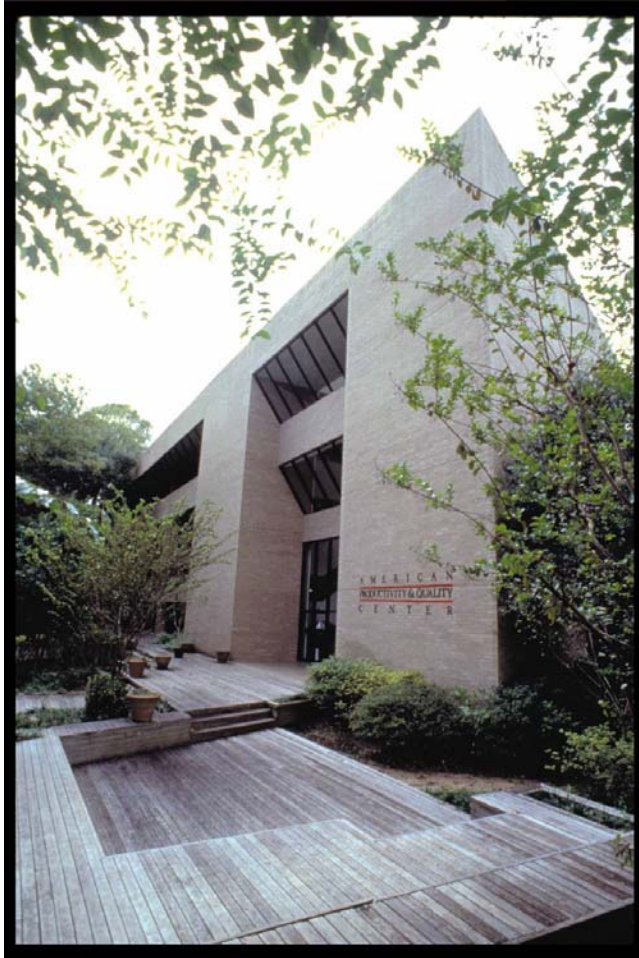
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- **Learn more about applied best practices in project management**
- **Scoping survey completed by 120 firms resulted in 3 Scope Areas:**
  - **Driving Consistency in Project Management Approach and Expertise**
  - **Building Project Portfolios**
  - **Measuring Project Delivery and End Results**



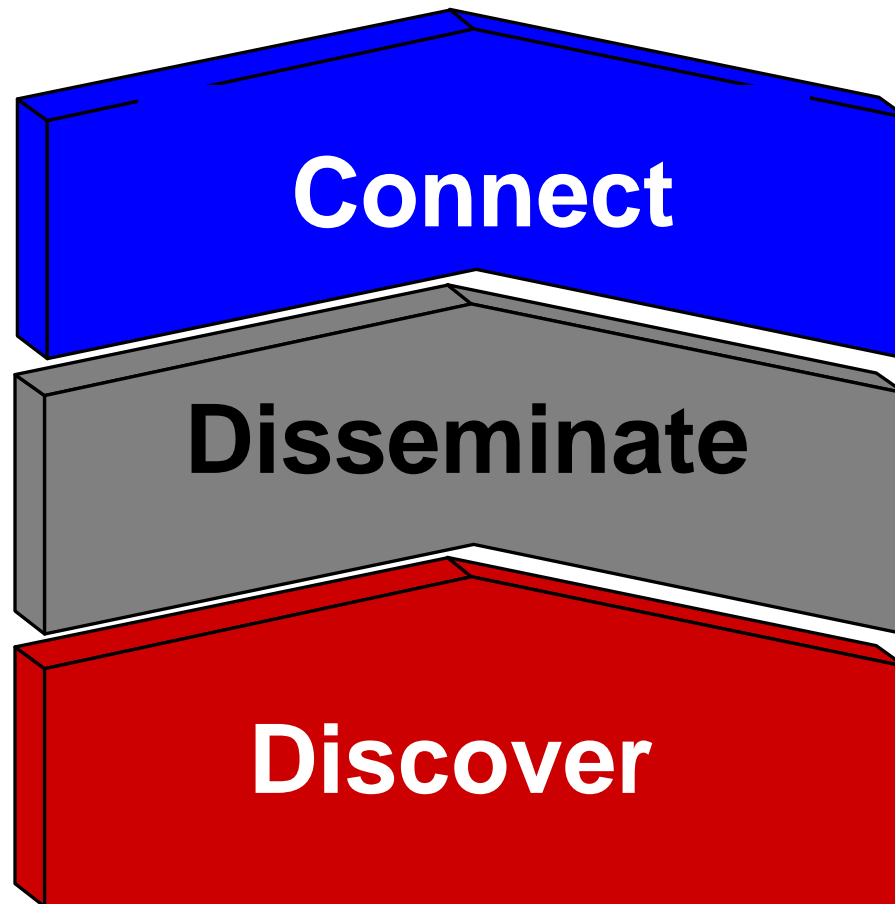
# THE AMERICAN PRODUCTIVITY & QUALITY CENTER (APQC)



- Houston, Texas; at The Houstonian
- Founded in 1977
- Non-profit 501(c)(3)
- Staff: 70
- Budget: \$11 million
- Board of directors—40; from business, government, healthcare, education
- 300+ Members



# THE APQC MISSION



**Membership  
Consortia  
Alliances**

**Publish  
Train  
Coach**

**Consortium  
Studies  
Client Support  
Methodologies**



# APQC's KEY MILESTONES



- **The White House Conference on Productivity**
- **Malcolm Baldrige National Quality Award**
- **Groundbreaking Research**
  - White Collar Productivity
  - People, Performance, and Pay
  - Intra-firm Transfer of Best Practices
  - Knowledge Management



# APQC's KEY MILESTONES



- **International Benchmarking Clearinghouse**
  1. Membership
  2. Best Practices
  3. Benchmarking Methodology and Code of Conduct
- **Knowledge Management Initiative**



# APQC MEMBERSHIP IS DIVERSE

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- Aerospace/Defense
- Automotive
- Banking
- Chemical/Petroleum
- Computers/Electronics/Electrical
- Consulting/Accounting
- Consumer Goods
- Distribution
- Education
- Food/Beverage
- Forest Products
- Government
- Health
- Hotels
- Insurance/Financial
- Office Products
- Manufacturing
- Mining
- Pharmaceutical
- Retail
- Telecommunications
- Transportation
- Utilities



# **SAMPLE of MEMBERS**

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- **Abbott Laboratories**
- **America Online, Inc.**
- **American Red Cross**
- **AT&T**
- **Bank of America**
- **Bank of Canada**
- **BASF**
- **BHP Billiton**
- **Boehringer Ingelheim**
- **Boeing**
- **British Telecom PLC**
- **Bristol-Myers-Squibb**
- **CEMEX**
- **Cendant**
- **CenterPoint Energy**
- **Citigroup Inc.**
- **Coca-Cola Company**
- **Daimler Chrysler AG**
- **Dow Chemical Company**
- **Eastman Kodak**
- **U.S. Federal Reserve Bank**
- **Ford Motor Company**
- **General Electric Co.**
- **General Motors**
- **Hewlett-Packard**
- **IBM**
- **Johnson & Johnson**
- **Kellogg**
- **Korea Productivity Centre**
- **Lockheed Martin**
- **Microsoft**
- **Procter & Gamble**
- **Schlumberger**
- **Tat Iron & Steel Co.**
- **3M Company**





# **SAMPLE GOVERNMENT MEMBERS**

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- **Federal Reserve System**
- **FDIC**
- **Government of Ontario**
- **NASA**
- **Oak Ridge National Lab**
- **Quebec Government**
- **UK Cabinet Office**
- **US Army**
- **US Air Force**
- **US Army War College**
- **US Coast Guard**
- **World Bank Group**
- **US Dept of Agriculture**
- **US Dept of Commerce**
- **US Dept of Navy**
- **US Dept of State**
- **US Dept of Transportation**
- **US Dept of Veterans Affairs**
- **US Dept of the Treasury**
- **US General Accounting Office**
- **US Internal Revenue Service**
- **US National Security Agency**
- **US Social Security Admin**



# EXAMPLES OF BENCHMARKING STUDY AREAS

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- **Brand Building and Communication**
- **Call Center Management**
- **Competitive Intelligence**
- **Customer Satisfaction**
- **Health and Productivity Management**
- **Internal Communication**
- **Knowledge Management**
- **Leadership Development**
- **New Product Development**
- **Performance Measurement**
- **Recruiting for Retention**
- **Strategic Planning**



# CONSORTIUM BENCHMARKING STUDY TEAM THAT LEAD THE PROCESS

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- **Sponsors**

- American Cancer Society
- ArvinMeritor Inc.
- Codelco
- ETHICON Inc. (Johnson & Johnson)
- Intel Corporation
- Serono International S.A.
- U.S. Naval Sea Systems Command
- UT MD Anderson Cancer Center

- **Alliance Partners**

- Project Management Institute (PMI)
- Association for Project Management (APM)



# NARROWING THE FOCUS

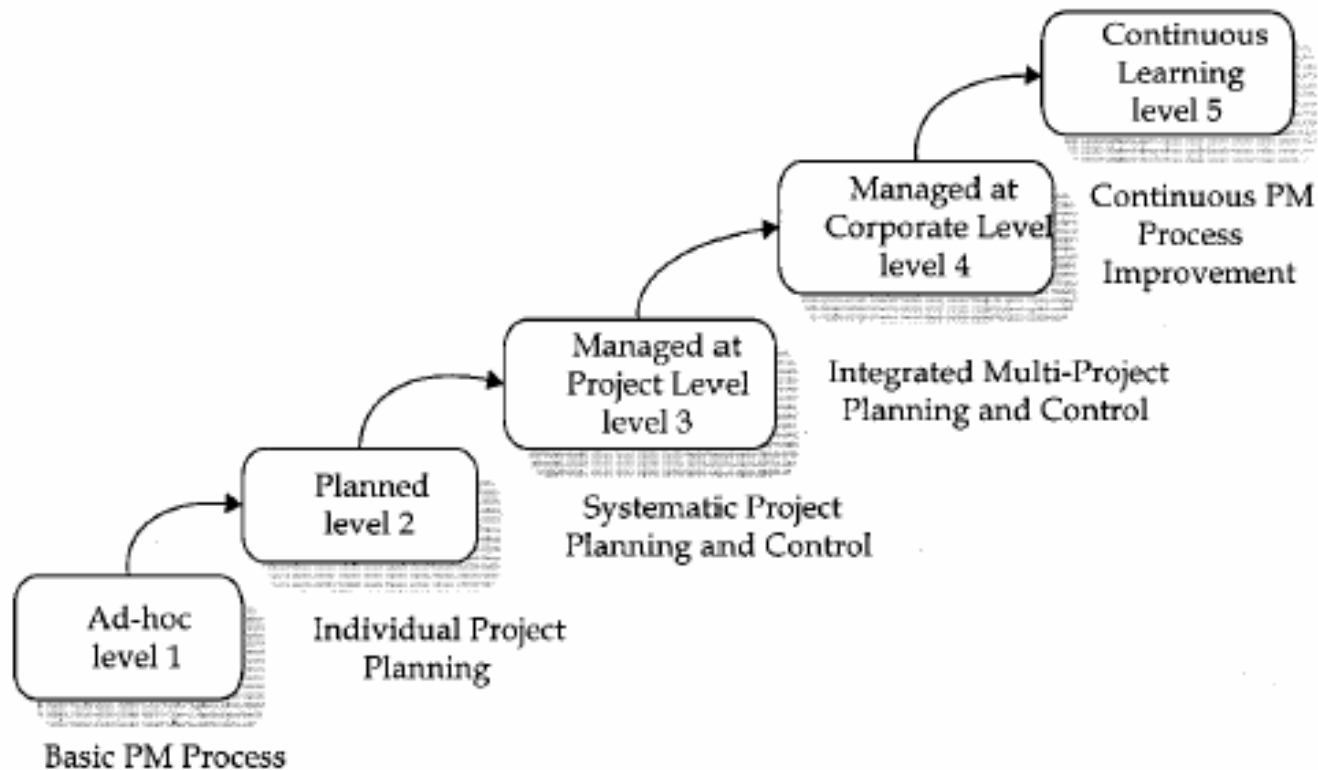
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- **Tools/Methods used:**
  - **Results and Data from Scoping survey - 120 firms**
  - **Partner selection via screening survey**
  - **Detailed questionnaire – 24 Firms**
  - **Selected 8 Best Practices Partners to Benchmark**



# WHAT WAS THE PM MODEL USED



## Project Management Process Maturity (PM)<sup>2</sup> Model



# KEY PROJECT MANAGEMENT PROCESSES OF (PM)<sup>2</sup> MODEL

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## Maturity Level

## Key PM Processes

Level 5	PM processes are continuously improved PM processes are fully understood PM data is optimized and sustained
Level 4	Multiple PM (program management) PM data and processes are integrated PM process data is quantitatively analyzed, measured, and stored
Level 3	Formal project planning and control systems are managed Formal PM data is managed
Level 2	Informal PM processes are defined Informal PM problems are identified Informal PM data is collected
Level 1	No PM processes or practices consistently available No PM data consistently collected or analyzed



# MAJOR ORGANIZATIONAL CHARACTERISTICS OF (PM)<sup>2</sup> MODEL

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<b>Maturity Level</b>	<b>Major Organizational Characteristics</b>
Level 5	Project-driven organization Dynamic, energetic, and fluid organization Continuous improvement of PM processes and practices
Level 4	Strong teamwork Formal PM training for project team
Level 3	Team oriented (medium) Informal training of PM skills and practices
Level 2	Team oriented (weak) Organizations possess strengths in doing similar work
Level 1	Functionally isolated Lack of senior management support Project success depends on individual efforts



# KEY FOCUS AREAS OF (PM)<sup>2</sup> MODEL

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## Maturity Level

## Key Focus Areas

Level 5	Innovative ideas to improve PM processes and practices
Level 4	Planning and controlling multiple projects in a professional matter
Level 3	Systematic and structured project planning and control for individual project
Level 2	Individual project planning
Level 1	Understand and establish basic PM processes





# THE BEST OF THE BEST

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- **Best-Practice Partners**
  - **Bausch & Lomb Research, Development, and Engineering (RD&E) Division**
  - **NASA JSC Center Operations Directorate (COD) – Facilities Management & Operations Division**
  - **Texas Instruments Information Technology Services (ITS) Division**
  - **Raytheon Integrated Defense Systems**
  - **Ford Electrical/Electronic Systems Engineering (E/ESE) Department**



# RESULTS



- **Findings:**
  - **Successful Project Management Office's have adopted operational methodology at all levels of the organization**
  - **The use of collaborative tools facilitates project delivery**
  - **Continuous refinement of project management processes drives improvement in future results**
  - **Effective project management organizations have thorough review processes and conduct frequent reviews**
  - **Partners use comparable data in project reviews and continuously re-evaluate the usefulness of their review measures**



# RESULTS



- **Findings Continued:**
  - Strategic alignment outweighs all other factors in project prioritization
  - Using effective pre-project analysis boosts strategic alignment
  - Use of company-specific methods to rank project portfolios address unique needs
  - Full-time Project Managers help drive success
  - Project Management is a core competency, not a sideline act
  - Customer satisfaction is a key stand-alone measure, not a byproduct of on-time or on-budget performance



# FINAL REPORT EXCERPTS

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- **NASA JSC COD** has broken down silos of communication between departments or functional areas. Barriers can affect a wide variety of issues including goal alignment & consensus building, project estimation, knowledge sharing, and team resource composition.
- **NASA JSC COD** uses metrics and statistical analysis behind the red, yellow, and green status reporting, with red requiring micromanagement and a corrective action plan and yellow requiring management involvement.
- **NASA JSC COD** also conducts detailed audits of the numbers behind its project review metrics to ensure that its metrics are both reliable and predictive.



# FINAL REPORT EXCERPTS

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- **NASA JSC COD** Project Management methodology for includes a 250-page process and procedure document.
- **NASA JSC COD** uses a systematic process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and customer requirements. Total Building Commissioning (TBCx)
- **NASA JSC COD** gathers customer satisfaction and quality data through surveys sent to occupants, other stakeholders, and team members as well.



# FINAL REPORT EXCERPTS

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- **NASA JSC COD** uses Continuous Improvement within the Project Management Office. The focus on Continuous Improvement is deemed essential for successful facilities delivery.
- **NASA JSC COD** has transfer the team building, facilitation, and partnering skills to project teams.
- **NASA JSC** The implementation of “front-end loading” best practices.



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**PROJECT MANAGEMENT:**

**BEST PRACTICES IN ACTION**

**JOHNSON SPACE CENTER - NASA**  
**CENTER OPERATIONS DIRECTORATE**

**FACILITIES MANAGEMENT &  
OPERATIONS DIVISION (JM)**



# JSC REAL PROPERTY



- 197 Buildings
- \$533 Million  
Current Book  
Value
- 4.3 Million  
Square Feet
- 1,620 Acres of  
Land
- 8 Miles of Roads







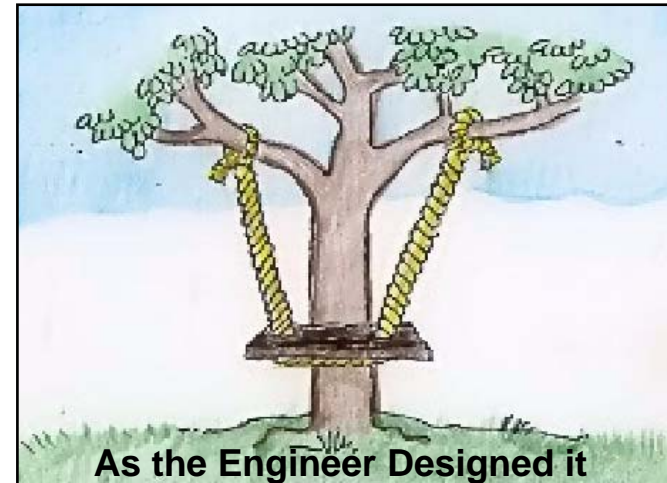
# FOCUS ON THE PROCESS



- **Key parts of our business that makes us successful at Facility Project Management.**
  - **Defined Process - NPR 8820.2e Facility Project Implementation Requirements and Guidance**
  - **Detailed Work Standards - ISC 9000 Yr. 2000 Certified**
  - **Continuous Improvement (CI) through Best Practice implementation - Engineering and Construction Innovation Committee (ECIC)**



# FOCUS ON THE PROCESS



A reflection of the Industry in which we deal

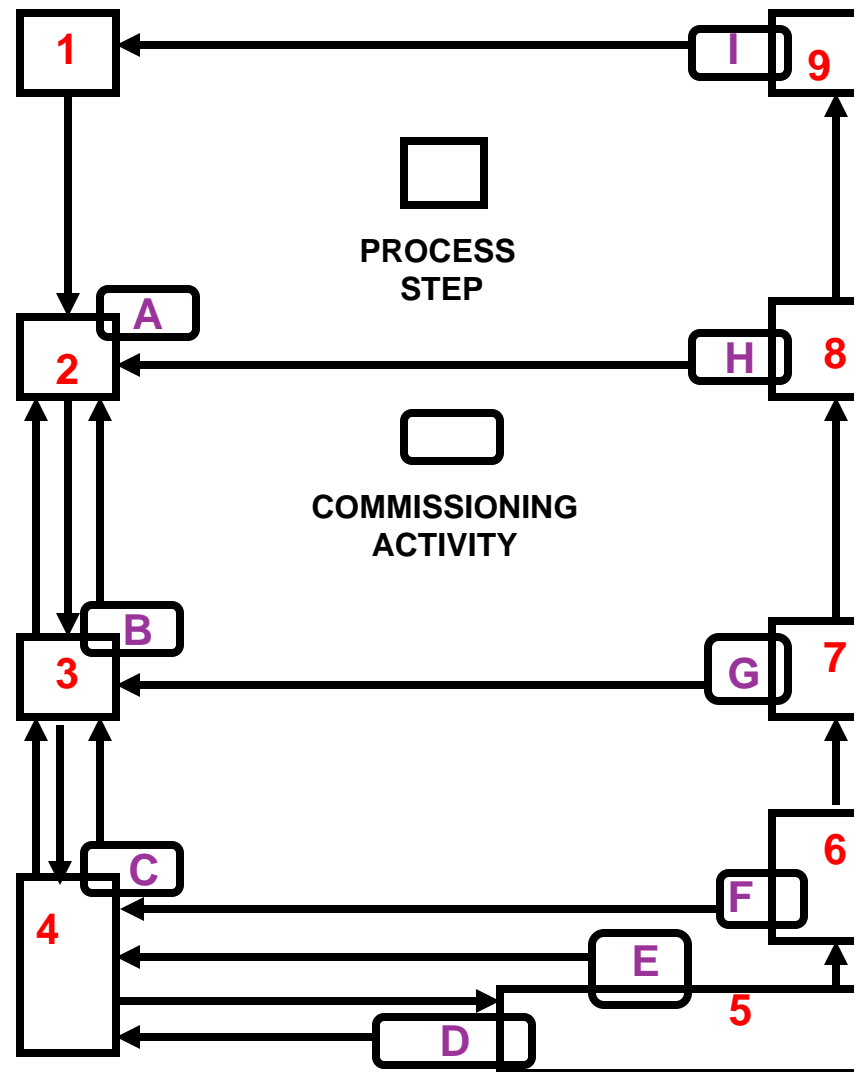


# THE FACILITY DELIVERY PROCESS STEPS



1. User Needs
2. Planning
3. Design
4. Construction Documents
5. Construction
6. Acceptance
7. Startup
8. Activation
9. Occupy

- A. Commission Plan
- B. Design V&V
- C. Const Doc V&V
- D. Change QC V&V
- E. Source QC V&V
- F. Field V&V
- G. Functional V&V
- H. Performance V&V
- I. User Validation





# FOCUS ON THE PROCESS



- **Improvements made in project management system.**
  - **Alignment: Eliminated Project “Stove Pipes” – Concept-to-Reality Project Managers (C2R)**
  - **Implemented “Front End Loading” Best Practices**
    - **Pre-Project Planning (P3)**
    - **Project Definition Rating Index (PDRI)**
    - **Constructability (Buildability, Operability, Maintainability)**
    - **Total Building Commissioning (TBCx)**
    - **Design for Maintainability, Safety, & Security**
  - **Implemented Teaming Skills Best Practices**
    - **Partnering**
    - **Team Building**
    - **Facilitating (Continuous Improvement & Lean 6 Sigma)**



# TYPICAL PROJECT TEAM MATRIX



- Project Manager - Team Lead/Facilitator (COTR)
  - User Representatives
  - Facility Management
  - Commissioning Authority (CA)
  - Architect & Engineer (A/E)
  - Safety & Mission Assurance
  - Construction Mgmt.
  - Security Resources
  - Construction Contractors & Suppliers
  - Information Resources
  - Environmental Res.
  - Energy Resources
  - O&M Contractor
  - Logistics
  - Move Coordination

Red – PMO

Orange – Matrix Organization

Green - Contracted



# FOCUS ON FRONT END LOADING ORGANIZING FOR PRE-PROJECT PLANNING (P3)



## Select Team

Skills, knowledge and authority

Project Management, technology, operations, and business

## Draft Charter

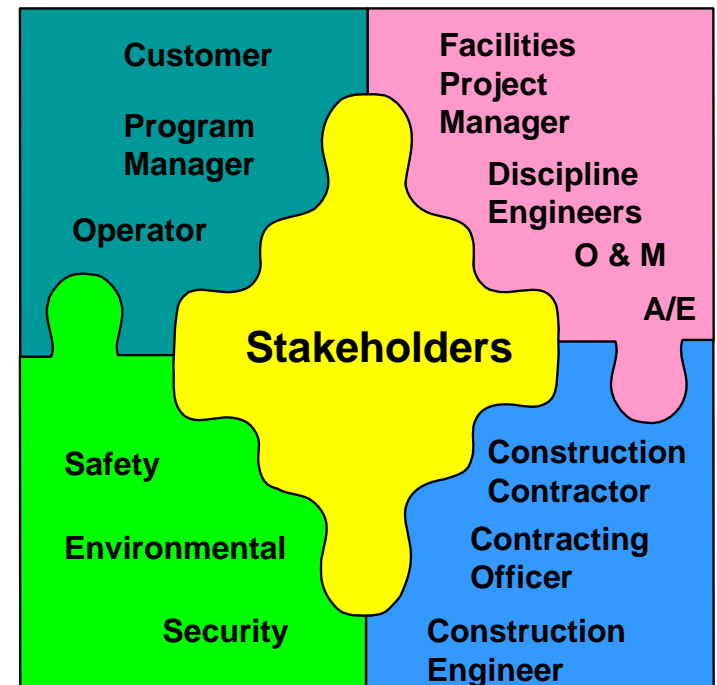
Define mission objectives

## Prepare Pre-Project Planning Plan

Document who, how, and when

Define needs, requirements and objectives

Define roles and responsibilities





# FOCUS ON THE PROCESS



- **Tools used to addressing issues of organizational culture and change management**
- **Knowledge Management**
  - **Brain Trust – FMOD Process Management Tool (Best in Class Artifacts)**
  - **Center of Practice – Engineering & Construction Innovation Committee (ECIC)**
- **Mobilizing Change: Seven Infrastructure - Center for Quality of Management (CQM) \***
- **Nine-Step Project Planning System (CQM) \***

\* **Shoji Shiba – A New American TQM**





# ECIC CENTER OF PRACTICE



Engineering Construction Innovations Committee (ECIC) - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Mail News RSS Feeds

Address <http://ecic-pbma-kms.intranets.com/default.asp?link=> Go Links

## Engineering Construction Innovations Committee (ECIC)

June 18, 2004

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	Title	File	Size	Posted By	Modified
<input type="checkbox"/>	<a href="#">CII Documents</a>		7 items		
<input type="checkbox"/>	<a href="#">FRB</a>		1 item		
<input type="checkbox"/>	<a href="#">June 2004 Maintenance Workshop info</a>		4 items		
<input type="checkbox"/>	<a href="#">May 2004 ECIC Face to Face @ WSTF</a>		4 items		
<input type="checkbox"/>	<a href="#">Nov 2003 ECIC Face-to-Face Washington DC</a>		5 items		
<input type="checkbox"/>	<a href="#">Sustainability</a>		4 items		
<input type="checkbox"/>	<a href="#">ASCE Constructability State of Practice Survey</a>	<a href="#">2004-03-01-ASCE-Constructability.pdf</a>	223.1 kb	Wei Hu	Mar 15, 2004 11:18 AM
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<input type="checkbox"/>	<a href="#">ECIC Members List 4/2004</a>	<a href="#">ECIC member list 4-2004.xls</a>	30.5 kb	Wei Hu	May 7, 2004 1:03 PM
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<input type="checkbox"/>	<a href="#">PBMA CoP General Charter</a>	<a href="#">CoP General Charter 7-2-</a>	44.5 kb	PBMA Admin	Dec 29, 2003 6:28 AM

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# MOBILIZING CHANGE



## *7 Infrastructure Elements*

Why do we need Improvement?

What benefit?

Mission/vision

1. Goal setting

2. Organization setting

3. Training and education

PUSH

Improvement Activities

4. Promotion

5. Diffusion of success stories

7. Diagnosis and monitoring

PULL

6. Incentives and awards

Output

Initiation/  
Orientation = 1, 2

Empowerment = 3, 4, 5

Alignment/  
Synchronization = 6, 7

Phase-in is inevitably a multi-year evolution, not an overnight revolution, requiring many loops through the three phases



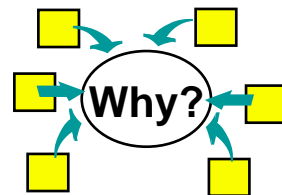
# 9-STEP ACTION PLANNING PROCESS



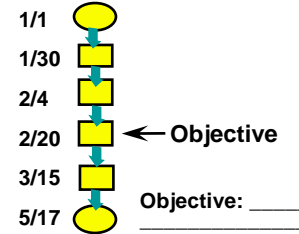
## Step 1



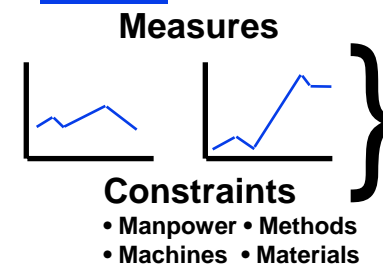
## Step 2.1



## Step 2.2

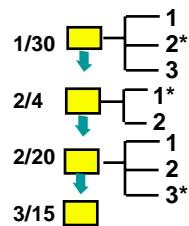


## Step 3



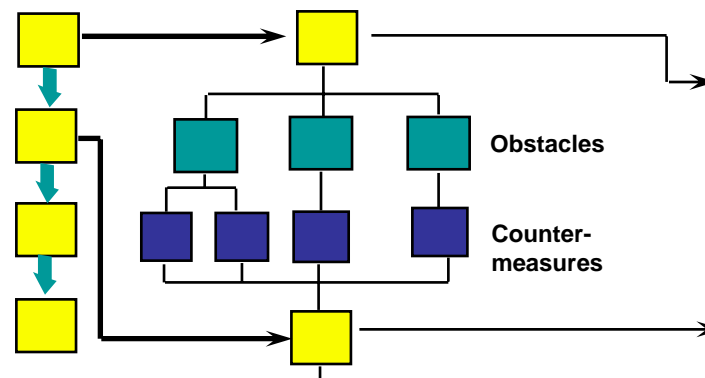
## Step 4

### Alternatives

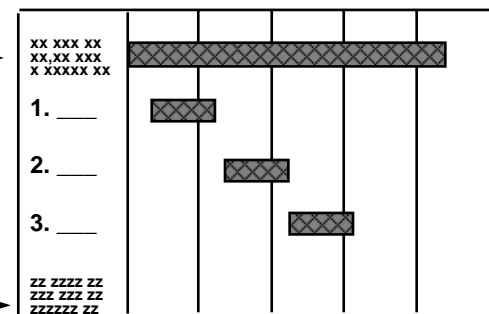


## Step 5.1

## Step 5.2/3



## Step 6



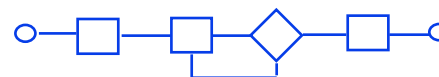
## Step 7

### Confirm Step 3 Measures



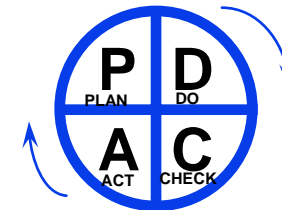
## Step 8

### Standardize



## Step 9

### Reflection





# FOCUS ON FRONT END LOADING

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- **Project Definition Rating Index (PDRI)**
  - Identifies and describes critical elements within the scope definition package and allows team to predict factors impacting project risk.
  - Provides quantitative data point to determine whether the project should proceed through budget cycle.
  - Facilitates the best investments
  - Improves project success



# SCORE SHEET CONTENTS

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- **Section I: Basis of Project Decision**
  - Three categories, 18 elements
  - "Right project"
- **Section II: Basis of Design**
  - Four categories, 32 elements
  - "Right product"
- **Section III: Execution Approach**
  - Four categories, 14 elements
  - "Right way"



# SECTION & CATEGORY WEIGHTS BUILDING VERSION



## Category Weights

## Section Weights

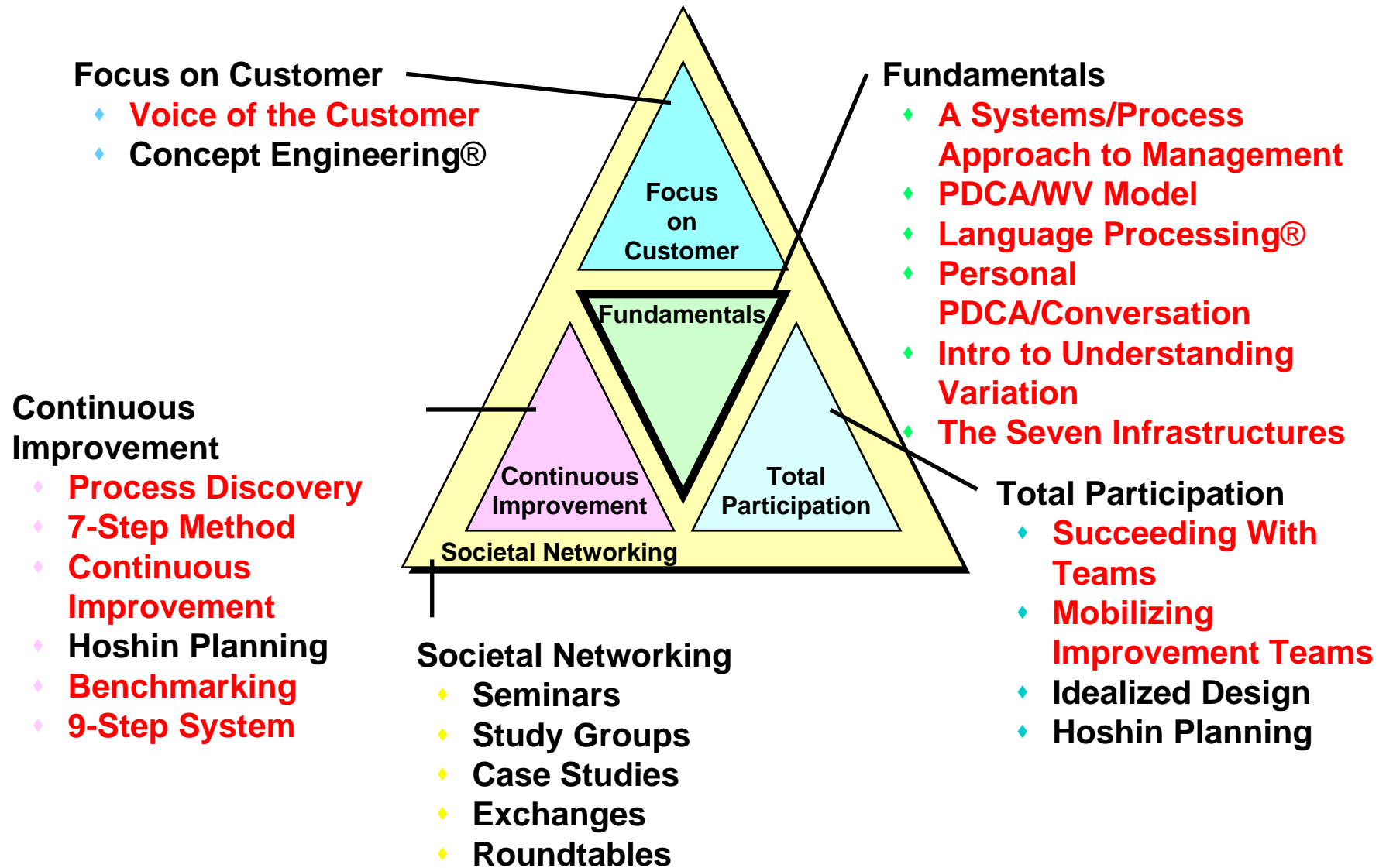
Section	Weight
I. Basis of Project Decision	413
<b>II. Basis of Design</b>	<b>428</b>
III. Execution Approach	159
	1000

Category	Weight
<b>A. Business Strategy</b>	<b>214</b>
E. Building Programming	162
C. Project Requirements	131
F. Building/Project Design Parameters	122
D. Site Information	108
B. Owner Philosophies	68
K. Project Control	63
L. Project Execution Plan	60
G. Equipment	36
H. Procurement Strategy	25
J. Deliverables	11
	1000



# FOCUS ON PEOPLE

## FOUR REVOLUTIONS OF MANAGEMENT





# FOCUS ON PEOPLE



## Mentoring Guide JM/Facilities Management & Operations Division

Area of Responsibility	Lead	Back-up
<b><u>Best Practices</u></b> (Champion Best Practices-Partnering, P3, Constructability, Total Bldg. Commissioning, Sustainable Design, Design for Maintainability, Safety & Security), Advocate for funding and training. Ensure proper tools and implementation of tools.)	Hoover	Wessels
<b><u>A-E Performance</u></b> (Ensure A-E reviews are completed. Evaluate A-E performances. Chair A-E SEB.)	Kerr	Campbell
<b><u>Facility Activation</u></b> (Lead Facility Activation improvements, Champion RCM into the construction contracts, Lead improvements in construction transition activities.)	McKinley	Noel
<b><u>Construction Management</u></b> (Evaluate Construction Contractors. Ensure PMO evaluations are completed.)	Noel	Hoover
<b><u>PMO Metrics</u></b> (Develop and maintain PMO metrics including customer Satisfaction Surveys, Cost and Schedule metrics. Evaluate monthly metrics and suggest areas for improvement.)	Pryor	Hoover
<b><u>Architectural Review and ADA Requirements</u></b> (Ensure adherence to JSC architectural standards. Review ADA requirements. Champion ADA efforts on all projects, where necessary. Provide architectural review on projects.	Shelmire	Noel
<b><u>Continual Improvement</u></b> Champion CI within the Office. Ensure personnel are trained and using CI. Assist in recommending areas for CI and potential tools to solve PMO issues.	Wessels	Hoover
<b><u>Design</u></b> Assist in all areas of design process.	Campbell	Bennet



# SUMMARY

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- **Focus on the Process**
- **Focus on the People**
- **Manage Knowledge**
- **Customer Care**





# THOUGHTS ON THE FUTURE

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- **With Globalization the Company flags may be as predominant than country flags.**
- **The workforce will be more independent and mobile both in location and in loyalty.**
- **Technology will tie the world together. We will all have the same access to unlimited information, how well we manage that information and knowledge will be the key.**
- **We will be overwhelmed if not prepared for a rate of change as it continues on its parabolic curve. The successful manager will be an agent of change.**
- **The organization that "Endeavors to Preserver" and depends sole upon "Process Control" will perish as Continuous Improvement, and break-through become the minimum standard.**